4

SHORT REMARKS
Upon AUTUMNAL DISORDERS of the BOWELS, and on the nature of ſome SUDDEN DEATHS, obſerved to happen at the ſame Seaſon of the Year.

THOUGHTS
On the natural Cauſes of the BILE's Putreſcency, and its Noxiouſneſs in the Circulation.

PHYSIOLOGICAL THOUHTS
On SPASMS, and the Seat and Origin of them in the Animal Oeconomy.

BY

ANDREW WILSON, *M. D.*

Fellow of the Royal College of Phyſicians at *Edinburgh*.

Eſt enim animorum ingeniorumque naturale quoddam
Pabulum, conſideratio, contemplatioque, naturæ.
CICERO.

NEWCASTLE UPON TYNE:
Printed by J. WHITE and T. SAINT,
for Meſſ. Wilſon and Fell, in Pater-noſter-row, London; A. Donaldſon, in Edinburgh; and J. Fleming, Newcaſtle.

MDCCLXV.

TO

Dr. JOHN RUTHERFOORD,

PROFESSOR OF THE

Theory and Practice of Medicine

IN THE

UNIVERSITY of EDINBURGH.

SIR,

THOUGH I know you are not extremely fond of ſpeculative refinements upon medical ſubjects, which I cannot ſay ſome parts of the following tracts are entirely free of; yet I cannot deny myſelf the pleaſure of addreſſing them to you.

THOUGH you have long honoured me with very particular marks of your friendſhip, I muſt ſtill reſpect you as my maſter, to whoſe judgment and correction I am even proud of ſubmitting my ſentiments, upon theſe ſubjects, which I ſhall ever acknowledge myſelf eſpecially obliged to you for your paternal inſtructions in the knowledge of. Your very cenſures have always been ſo delicate and obliging to me, that, next to your entire approbation, I would court them as the greateſt compliment I can receive from you.

I SHALL ſay nothing of your extraordinary merit and experience in your profeſſion: that is far more extenſively known, than this ſmall performance would be likely to carry it. You know that I am,

With inviolable Eſteem and Reſpect,

SIR,

Your moſt obliged,

And moſt obedient

Humble Servant,

ANDREW WILSON.

AN

INTRODUCTION.

THE principal intention of the firſt ſmall treatiſe contained in the following Sheets, is to propoſe as ſhort and as clear a definition as I can, of the diſtinguiſhing characters of theſe diſorders the Bowels are moſt ſubject to after long continued heat, upon the decline of ſummer, or even the approach of winter, eſpecially if the weather proves remarkably open.

WHETHER theſe complaints fall under the denomination of accidental, conſtitutional, epidemic or endemic, and they will ſometimes be found referable to each of theſe different characters; yet ſtill amongſt us, the ſeaſon of their appearing is in a manner confined to the decline of the year. So that the ſame conſtitution which, by any inherent prediſponing cauſe, is in autumn, by any error of the non-naturals, thrown into what is called one of the bilous or ſpaſmodic diſorders of the bowels, would, if the ſame error or procatartic cauſe were to happen to it in the rigour of winter, or in the ſpring, be ſeized not with one of the above-mentioned diſorders, but with ſome other one correſponding with the temperature and genius of that ſeaſon.

THESE

THESE ſymptoms of diſeaſes which are called the *communia* being moſt general and obvious, a perſon who is but tolerably acquainted with them is apt to think himſelf pretty well accompliſhed for practice; but as it is an ability to diſcern the *propria* among theſe, which is a ſure guide in practice, ſo the want of that diſcerning, and of theſe principles which lead to it, may prove the occaſion of much raſhneſs and of many blunders. Hence it is that ſome people are ſo often encountering moſt dangerous diſeaſes. It is a piece of low craft too common among thoſe practiſers of phyſic, who are leaſt qualify'd to diſtinguiſh among ſimilar ſymptoms, to call the diſeaſe always by the worſt name theſe ſymptoms can be apply'd to; but if they really confound a bilous, ſpaſmodic or flatulent diſorder in the bowels, with an inflammation in them, they may ſpeedily in ſome caſes render the one as dangerous and fatal as the other generally is in its own nature.

As it is a right judgment of the *propria* (paying due regard at the ſame time to the *communia*) which in every diſeaſe points out the diſtinct indications of cure; I have not thought it neceſſary to ſubjoin to my definitions any method of cure. If the indications are diſtinct, there is generally a pretty copious choice of medicines to anſwer the intentions, if not ſome certain ones which are particularly depended on: but after the ableſt practitioners are clear as to the particular indications of cure, they can ſo rarely purſue theſe intentions of cure directly, without encountering antipathies, ſingularities in conſtitutions, and which is worſt of all contraindications, that the mentioning of particular medicines or forms muſt be of very limited uſe.

WHAT I have ſaid upon ſudden deaths, I do not propoſe as infallible or unexceptionable; the ſymptoms I deſcribe were collected from the moſt attentive obſervation I could make upon ſome patients I ſaw who died ſuddenly at that ſeaſon of the year: theſe ſymptoms were ſo totally different from thoſe of an apoplexy or palſy, and ſome of them bore ſo great a reſemblance to ſome autumnal complaints, that I was induced to trace and explain theſe ſymptoms which ſeemed ſeated in the middle cavity, by anatomical reaſoning, upon the correſpondence and ſympathy eſtabliſhed between the nerves of the abdomen and thorax. It is poſſible that a polypus, under certain circumſtances, may produce ſeveral of the ſame ſymptoms, tho' I think others of them cannot be ſo eaſily explained by it: however my obſervations were too few, and to ſome better judges may appear too precarious, to eſtabliſh any particular doctrine upon: therefore what I offer upon that head, I deſire may be conſidered only as a theſis or ſubject of more mature examination and obſervation.

IN order to give ſomething of a connected view of autumnal diſorders of the inteſtines, I thought it would not be improper briefly to reſume, in the beginning of this paper, the plan of the Eſſay on the Dyſentery.

The thoughts upon the Bile in the ſecond paper, were naturally ſuggeſted by the ſubject of the preceding one. The doctrine of the four humours or temperaments, and of the four elements, upon which the temperaments were founded, and out of which they are ſuppoſed to be compoſed, has been long neglected and laid aſide, tho' univerſally taught and received by the ancients; with how much juſtice I will not take upon me to determine: but the celebrated and judiciouſly cautious Boerhaave, who may be eſteemed the prince of mechanic phyſicians, judged that diſtinction uſeful and neceſſary. Now tho' both chemical and mechanical knowledge and reaſoning, chaſtely uſed, are capable of giving great improvement to phyſic, and in many reſpects have done ſo; yet I may be allowed to preſume, that in ſome caſes they would be more uſefully apply'd in explaining, and rendering more intelligible, theſe, and ſome other doctrines tranſmitted from antiquity, than in totally diſcarding diſtinctions, which were univerſally regarded by the greateſt and moſt ſucceſsful phyſicians of antiquity, and in former ages, in regulating their practice. If I am not miſtaken, even Hypocrates and Galen have conſidered theſe temperaments not only as characteriſtic of different natural conſtitutions, but as what conſtitutions can be in ſome meaſure changed into, by the difference of ſeaſons and the ſituations of places. It is very certain that many of theſe diſeaſes, which were once accounted for by predominacy, or vitiation of the bile; ſuch as fevers, quartan and other intermittents of bad types, are autumnal ones: and it ſeems alſo certain, that great and long continued heats have a tendency ſome how or other, to impreſs the bile with an unfavourable character, with ſome kind of malignancy or other, however it may be explained.

THE laſt ſhort Eſſay is profeſſedly phyſiological, or rather ſpeculative. The reaſoning is however founded upon two facts certainly exiſting in the human conſtitution: theſe are the ultimate fibres, and the ſubſtance of animal heat, and their conjunct longitudinal or progreſſive influence in ſupporting both the involuntary and voluntary functions of life. When, ſo far as can poſſibly be traced, one perceives the moſt accurate and refined mechaniſm in every part, it is even more than plauſible, to preſume that it ſubſiſts and is carried on far beyond the limits of our groſs ſenſes, which are confined to a very contracted horizon. Though I never called in queſtion the union of ſoul and body, in every rational creature capable of receiving the knowledge of a Creator, yet I cannot perſuade myſelf that mechaniſm is any neceſſary link of the chain which connects either occult quality, general law or what is truly immaterial, to what is material. When I am conſcious that every organ of ſenſe is a piece of inimitable mechaniſm; I cannot help concluding, that the exerciſe of every ſenſe muſt be the direct effect of that mechaniſm. The exquiſite refinements with which all the operations of nature are carried on, and the mechanical adjuſtment of all the parts, ſo far as the connexion between cauſe and effect can be either traced or neceſſarily inferred, teaches us both to ſuppoſe, that the progreſſion of mechaniſm is to us at leaſt interminable in the conſtruction of things; and at the ſame time, that limited creatures ought not to be dogmatic, in taking upon them to define the manner of its exiſtence too peremptorily: ſeeing mechaniſm may hold out, and yet be carried on in a manner quite different from our beſt conjectures; which can be no ſtandard for judging infallibly, of the method in which an infinite artiſt may adjuſt and terminate his machinery. It follows, that even the moſt plauſible theory ought neither to be conſidered as abſolutely certain, nor truſted to as a ſufficient guide in Practice, further than it is either a neceſſary inference from certain fact, or ſupported by experience and obſervation, evident ſymptoms and their natural Indications, which are juſt and true, and the only ſure foundation of practice, whether we can explain them ſatisfactorily or not. Therefore any obſervations which are to be found in this paper, particularly towards the cloſe of it, are offered as no certain inference from the reaſoning; but as hints intended to be uſeful, though the reſt of it ſhould be no more than a piece of ſpeculative entertainment.

SHORT

REMARKS, &c.

SOME years ago I was induced by the prevalence of that Diſeaſe for two ſucceſſive Seaſons, to publiſh a ſmall Eſſay upon the autumnal Dyſentery. The principal Intention of that Diſſertation was to ſuggeſt that a remarkable ſluggiſhneſs and inability of the Inteſtines in the diſcharge of their ordinary functions, and of conſequence harden'd, knotty Excrements was a general and important Symptom of that Diſeaſe; which I did not remember to have been remarked or inculcated by any Author upon that Subject. The aſſurance I had of this fact convinced me that not only in the Beginning, but even through the whole courſe of this Diſtemper, at leaſt until the diſcharges became regularly excrementitious, a regular uſe of Emetics, and ſuch purgatives as the degree of fever and other ſymptoms authoriſed, were neceſſarily indicated in the Cure of it: whereas reſtringents, abſorbents, and all driers as ſuch, contrary at leaſt to vulgar practiſe, were not only uſeleſs, but hurtful before the decline of the diſorder.

THE only exception I could make to this was, when any dangerous and imminent ſymptoms of putrefaction or of mortification demanded an immediate Recourſe to ſuch commonly reputed aſtringent Medicines, as were neceſſarily indicated on account of their predominate and avowed antiſceptic and alexipharmic qualities.

TRULY a Dyſentery is not more diſtinguiſhed from a Diarrhea by the excruciating Pains and Teneſmus which attend it, than, in my opinion, it is by the remarkable inactivity of the periſtallic motion of the bowels, and conſequenquentially by the hardened State of the Excrements ſo commonly diſcharged in that diſeaſe, which require purgative irritation, not only to diſlodge them, but to ſupport that motion of the Inteſtines, upon which a regular diſcharge of the Excrements afterwards depends. I may be miſtaken, but I have been ſometimes inclined to apprehend, that the very name δυσεντερια may, in the ſenſe of thoſe who firſt gave that appellation to the diſeaſe, have as much a reference to this characteriſtic of it as to the pains which accompany it.

From the certain influence of the Seaſons upon our Conſtitutions, I likewiſe endeavoured to deduce the reaſon why vernal and autumnal diſeaſes differed from each other, not only in the ſtate of the fluids, but alſo as to the different Seats of the Epidemics which moſt commonly prevail at theſe oppoſite ſeaſons: the Spring diſeaſes moſt commonly ſeizing the lungs and its connexions, while harveſt ones more generally fall upon the abdominal Viſcera, that is, theſe parts which are contained in the belly, or which are moſt immediately connected with them. Beſides the Stomach and Inteſtines, the greateſt number of the largeſt Glands in the whole Body are lodged there, ſuch as the Pancreas, Spleen, Liver, Kidnies, Glandulæ Renales, &c. The Surface of the Skin and Lungs being relaxed by the Summer's heat, and accommodated to the encreaſed quantity of perſpiration determined thither and exhaled, any Plethora occaſioned by a diminution or ſuppreſſion of theſe diſcharges muſt load theſe organs in the belly, whoſe ordinary ſecretions are moſt languid at that time; and ſo much the more apt it will be to do ſo, if the approach of Winter or of a colder Seaſon naturally tends to reſtore the action and ſecretions of theſe internal parts to that vigour which they acquire, when the perſpiratory pores are more cloſed by the coldneſs of the Seaſon.

THERE is indeed one thing which ſeems not ſo intirely to agree with this account, and that is the ſeemingly encreaſed appearance of the bilous ſecretions in moſt autumnal diſorders. But whether it is a natural effect of the autumnal ſeaſon to produce an overflow of bile as a cauſe of theſe complaints; or whether the encreaſe of it is not in a greater meaſure produced in a ſecondary way, by the previous irritation and pain of the parts immediately correſponding with the bilous excretories, under their affections, does not to me appear quite ſo determinate and certain: however that is, there is great reaſon to apprehend that the Bile, which at all times is noxious in the blood, has then more of that deleterious quality than at any other ſeaſon; and therefore, when taken up into the circulation in any quantity, may prove the cauſe of the moſt malignant diſeaſes.

Upon the ſame principles, I further endeavoured to explain the oppoſite effects that Summer and Winter, or hot and cold ſeaſons have upon the ſtate of our fluids. The diſſolved ſtate of the blood produced by hot ſeaſons and putrid infections which are moſt predominant then, has been obſerved and fully inſiſted on by all the moſt judicious Authors, who have treated of theſe ſubjects; but nevertheleſs, tho' I was ſenſible that heat produced both relaxation of the ſolids and expanſion of the fluids, yet, through inattention, or ſlowneſs of apprehenſion, I remained ſtill at a loſs in my own mind, how to infer putrefaction from theſe concurrent cauſes of it, until I conſider'd the animal fluids as poſſeſſed of two different motions, which in health balanced each other, and which were the immediate ſupporters of the *Callidum innatum*

natum, and not the external temperature of the air, the blood of a healthy perſon being as warm, if not warmer, in Winter than it is in Summer.

THESE two motions are the progreſſive motion of the blood along the veſſels; and, the inteſtine motion of its parts among themſelves. Now it is certain, that whatever unbraces and enervates the ſolids, muſt retard the progreſſive motion of the blood; in proportion as its progreſs is retarded it will have both greater diſpoſition and opportunity to encreaſe its inteſtine motion, and ſo to degenerate from an animal into a putrid tendency and diſſolved ſtate; and as putrefaction is a ſpecies of fermentation, or of inteſtine motion changing the nature of ſuch fluids as are capable of undergoing a change of their natures and qualities, ſo the animal fluids being very ſuſceptible of this motion and change, when permitted to fall into it by weakening their progreſſive motion, the relaxation of the ſolids muſt greatly favour this tendency, by yielding to that expanſion of parts which all fluids acquire during their ſtate of fermentation.

Now this being the caſe, I preſume, by a parity of reaſoning from theſe circumſtances reverſed, that an obvious cauſe is alſo ſuggeſted for that glutinous viſcidity and fibrous tendency of the blood in inflamatory diſorders, and in caſes of too rigid fibres and too briſk circulation. The diſpoſition to an animal degree of inteſtine motion being over-balanced and prevented, and the animal heat thereby raiſed conſiderably above that degree which diſpoſes it to ferment, it diſpoſes the fluids more to cake, coaleſce and go on where they can paſs, in too adhering continuity; which muſt give them a particular aptitude to form inflamatory obſtructions. It is to be obſerved even of viſcous liquors, which have no progreſſive motion along with their inteſtine one, that when they are ill, that is, not thoroughly fermented, they are apt to turn ropy and viſcid.

THERE is one practical maxim with regard to a diſſolved ſtate of the blood which natively may be inferred from the above account of it, ſo far as it is juſt. Whatever urges the progreſſive motion of the blood, muſt reſiſt its tendency to diſſolution; and I would claſs *emitics* in the firſt rank of medicines ſubſervient to this effect. I ſhall leave it as a query, what may be the effect of opiates in the like caſe? they are known to enlarge the pulſe, though they do not quicken it. It is true indeed, they are very lethiferous medicines in Dropſies, which are pretty much akin to diſeaſes ariſing from diſſolution; but then may not this very effect ariſe from their augmenting the circulation. So large a quantity of already-diſſolved humours being ſtagnant without the limits of the circulation, a conſiderable increaſe of the circulation may produce ſuch a large abſorption of putrid fluids, as may haſten that degree of diſſolution in the circulating ones, which renders them totally uncapable of performing the vital functions any longer, eſpecially in the latter ſtages of that diſeaſe.

THOUGH the Dyſentery has not appeared here as an Epidemic ſince the years which gave occaſion to the Eſſay upon that diſeaſe, yet ſince that time other autumnal affections of the Bowels have been more frequent than ordinary; ſuch as Choleras, bilous Cholics, dry Gripes, Inflammations of the Bowels, nay there have even been ſome inſtances of ſuch obſtinate affections of the Bowels as the Cholic of Poitou. Though theſe diſorders may occaſionally occur at any ſeaſon of the year, ariſing from particular cauſes and habits in particular perſons, and though contrary to the obſervation of Sydenham, the Cholera Morbus in particular has made its appearance in ſome late ſeaſons here pretty early in the ſummer months, yet it is certain that theſe diſeaſes conſidered as Epidemics properly belong to the autumnal claſs.

AMONG theſe Epidemics I am inclined to arrange the cauſe of ſome ſudden deaths which have happened at ſuch times, and which, according to the general opinion of almoſt all ſudden deaths, were commonly referred to, an Apoplexy. But before I explain what appeared to me to be the cauſe of ſuch fatal unexpected accidents, I ſhall, in order to be better underſtood, and in order to diſtinguiſh them clearly from each other, and from other diſeaſes in the Bowels which are not peculiar to any ſeaſon, take a ſummary view of theſe affections of the Bowels which are properly autumnal.

The characteriſtic ſymptoms of the Cholera Morbus are a vomiting and purging with ſevere twiſtings in the Stomach and Guts, which rarely holds out for 24 hours if it is timeouſly taken; but if not, may prove fatal in leſs than 48. In general it requires neither bleeding nor purging, though in ſome full habits bleeding may accidentally do no hurt: therefore it is not ſafe to make too bold with evacuations; for it is to be obſerved, that in that diſeaſe the Pulſe rarely riſes to a febrile height by the continuance of the pain, but on the contrary, if the diſeaſe is neglected too long, the Pulſe always ſinks more inſtead of riſing, the extremities grow cold and a clammy dampneſs ariſes upon the ſkin of eſpecially the face and extremities. On the contrary, as the pain is relieved the body grows warm and the pulſe enlarges: that is, a ſymptomatic Fever is excited by the pains and throws of that diſeaſe, after its violence is over; which fever requires nothing but a little of that quietneſs and keeping a woman does, when ſhe is put into bed after the pains of child-bearing. It is proper to obſerve alſo, that after the diſeaſe itſelf is gone off, and this feveriſh heat is come on, the patient for ſome time continues to complain of pain both in the back and in the breaſt about the upper ſurface of the ſtomach; which, through want of experience and judgment, may be interpreted as the diſeaſe or its cauſe ſtill lurking in the bowels, and be treated accordingly, when it is nothing elſe than a pain left in the Diaphragm at its attachment round the ribs and other bones to which it adheres, occaſioned by the ſtraining of its muſcles during the violent efforts of vomiting excited by the diſeaſe, which will naturally be relieved by only encouraging that warmth and moiſture which ariſes over the body when the ſymptoms of the diſeaſe itſelf are quieted.

THE Bilous Cholic and the Cholera Morbus reſemble each other pretty much, and are indeed nearly allied in their natures. The vomiting of bile in the cholera is not ſo early as it is in the other; neither is it ſo conſtant, nor in ſo large quantities. Though a purging generally attends the bilous cholic, yet it does not correſpond ſo regularly with the fits of vomiting, as it does in the cholera, in which there generally is a call to ſtool ſoon after every paroxyſm of vomiting: from whence one would infer if there is the ſame quantity of bile wrung out by the cramp or ſpaſms upon the inteſtines in both theſe diſeaſes, yet in the one there muſt be more ſqueezed backward into the ſtomach by the reverſed periſtaltic motion, than in the other. The bilous cholic is not generally ſo quickly hazardous as the cholera is. The intervals between the ſick fits are often longer, and when it is attended with danger it does not become ſo, ſo ſuddenly as the cholera does. The bilous cholic, though an autumnal epidemic, is not ſo wholly confined to that ſeaſon as the cholera is; neither is it ſo ſoon relieved by medicine as the other, the fits often recurring after the patient is ſeemingly quieted, which rarely happens in the other diſeaſe. Both of them are apt to excite cramps and pains in other parts of the body, and while theſe continue the wringing pains of the diſeaſe are quiet.

It is ſometimes difficult to diſtinguiſh the firſt attacks of the Gravel Cholic from thoſe of the Bilous one, nor can they ſometimes be at all diſtinguiſhed until ſome critical ſymptom of the gravel, ſuch as pain in the Region of the Kidnies or in the courſe of either Ureter, &c. determines it, which does not always happen early. This intercommunication of ſenſibility among all the great Viſcera of the lower belly is certainly intended for a very wiſe and important purpoſe, and directs a judicious phyſician to be cautious in taking his indications of cure, when perhaps a more unſkilful practitioner will ſee no difficulty in the caſe. In ſhort the bilous cholic is imitated, nay even emulated in its ſymptoms by all diſeaſes which excite violent and repeated efforts of vomiting, as witneſs the caſes of breeding women, and of the ſea ſickneſs; which evinces that the bilous cholic itſelf can ſcarce be owing to a mere encreaſed ſecretion of the bile, but much rather that the ſecretion is an effect of a previous ſpaſm or irritation upon ſome neighbouring ſenſible parts, which draw the Gall Bladder and its ducts into conſent.

THE Hyſteric or Nervous Cholic upon its abating often brings on the ſymptoms of an Icteric diſorder or Jaundice, from a different cauſe: the ſpaſms in that diſeaſe affecting the excretory orifice of the common duct of the gall bladder itſelf, where it opens into the duodenum, ſhut it quite up, ſo that the bile being denied a paſſage during the continuance of the pain, regurgitates and is abſorbed into the circulation again; which appears upon the colour of the ſkin generally ſoon after the cauſe which produced it is removed. This cholic and that ſuperveening icteric ſymptom are very ordinarily, both of them attributed by ſome practitioners, to gall-ſtones paſſing through the duct, irritating its coats and obſtructing the paſſage, when there is no ſuch thing: for though it is very certain that ſuch gall-ſtones are ſometimes formed in that bladder and are diſcharged from it, the diſeaſe is not ſo common as they apprehend; and from what we know of proper icteric diſorders unmixed with any affection of the other Viſcera, which muſt ariſe from obſtruction of that duct, it does not appear that either the gall bladder or its canals are endowed with much ſenſibility. The way to affect them is to produce an irritation upon the neighbouring viſcera. This gives another indication for the propriety of repeated vomits in the jaundice, beſides its uſe in ſhaking the ducts and looſening the obſtruction, whether ſtone or viſcid mucus there; for ſeeing it is evident that all vomiting tends to affect the gall bladder ſo as to ſollicit an encreaſed diſcharge from it, there cannot be a more natural way of trying to force the paſſage than by encreaſing the ſecretion, which muſt have a tendency both to looſen the obſtruction and facilitate its paſſage, by floating it along with the natural ſecretion. Indeed if the obſtruction is obſtinate, which cannot eaſily be determined at firſt, however ſimple a diſeaſe and however

ever eaſily cured the Jaundice is commonly imagined to be, I ſay, if the obſtruction is obſtinate, an increaſe of the bilous ſecretion while it muſt be reabſorbed will heighten the diſeaſe and the ſymptoms of it upon the ſkin.

THE ſeat of the dry Gripes, an autumnal diſorder here, but common I apprehend at all times in hot equinoxial climates among thoſe who are natives of colder countries, ſeems to be more confined to the ſmall guts. It diſtinguiſhes itſelf from the Iliac paſſion, by its not riſing to ſuch an acute inflammatory height as it does, by the pulſe not being ſo hard and quick, which on the contrary is ſometimes remarkably ſluggiſh; it alſo characterizes itſelf by the black colour and knotty ſtate of the excrements when they are forced off, and by the pulſe both riſing and quickening upon the obſtructions being diſlodged. It is the reverſe of the Dyſentery principally in this; in the one caſe the ſeat of the pain is *above* the obſtruction, and in the other caſe it is *below* it.

THE Cholic of Poitou, at leaſt any thing I have ſeen reſembling the deſcriptions given of it, ſeems to be an obſtinate complication of the bilous cholic, the dry gripes and of dyſenteric pains, very ready to degenerate into a chronic diſorder in reſpect of its duration, though attended with all the pain of an acute one. It is no wonder that it ſhould be ſo, when all the different diviſions of the ſtomach and inteſtines are affected by that epidemic at the ſame time; it alſo bears this mark of black coloured bilous excretions in common with all the other autumnal affections of the bowels.

THERE is one other ſymptom of conſequence, which is in ſome meaſure common to all theſe epidemics, and it requires the more particular attention as it prevents ones being thereby miſled ſo as to confound any of theſe diſorders with two other very grievous affections of the bowels yet unnamed; namely, the Gout and the Rheumatiſm: but tho' theſe autumnal affections of the bowels may be ſometimes complicated with the gout and rheumatiſm, which as particular diſeaſes have their cauſe inherent in the conſtitution, and are properly diſeaſes of the fluids; yet the ſymptom I ſpeak of, namely, aking and ſometimes very intolerable, pains in different parts of the body and limbs, moving about, ceaſing and returning very unaccountably, yet difficult often to get wholly rid of, I take to be quite diſtinct from either a proper gout or rheumatiſm.

It is evident from the faithful hiſtories we have of both the Cholic of Poitou and of the Devonſhire Cholic, the primary ſeat of which, as well as of the other diſeaſes I have mentioned, is in the digeſtive viſcera, that by a ſtrong ſympathy of very ſenſible nerves between theſe bowels and the other members of the body, which is traceable enough in ſome of their ramifications and intercommunications, and I have no doubt but they may be further traced by refined anatomiſts; it is evident by that ſympathy, I ſay, that theſe grievous diſeaſes are both tranſlated and extended to the extremeſt parts of the body, ſo as to produce cramps, fixed pains, numbneſs and even palſies themſelves.

I THINK there is great reaſon to aſcribe theſe autumnal diſorders of the bowels to cramps or ſpaſms, which the ſtate of the fluids are apt to throw the nerves into at theſe times. It is very certain that people of delicate or relaxed conſtitutions, or of vitiated ſcorbutic habits, who are moſt ſuſceptible of impreſſions from the ſeaſons; even though they eſcape any of theſe diſeaſes, they are at ſuch times often affected with ſlight, temporary flying pains in the back, breaſt, ribs, &c. or with twichings about the ſtomach, guts and precordia, which come and go, but which have neither the acuteneſs nor permanency of true pleuretic or rheumatic diſeaſes. Even fixed like acute ſtiches, which I have met with in pretty aged perſons of drooping conſtitutions at theſe ſeaſons, ſeem to be a variation of the ſame diſeaſes. They are attended with no fever, and eaſily yield to ſome proper application without any neceſſity of bleeding or other conſiderable evacuations, which would do more hurt than ſervice in ſuch caſes. It is no wonder at all, conſidering the marvelous conſent eſtabliſhed throughout our nervous ſyſtem, that in theſe diſeaſes, eſpecially ſuch violent, excruciating and obſtinate ones as the two above-mentioned cholics, the nerves of the organs of digeſtion, which ſeem to have a leading ſympathetic connexion with, and influence upon the whole nervous ſyſtem, eſtabliſhed among other ends in all probability to relieve ſuch immediate organs of life, ſhould bring the nerves of the extremities into ſuch a ſtate of conſent as to be able to throw the load off themſelves upon theſe; with ſuch weight in ſome caſes as to produce the moſt obſtinate fixed pains and even numbneſs and palſies themſelves.

How cramps are produced is perhaps not ſo eaſy to explain; that belongs properly to the more curious and abſtracted reſearches of phyſiology. They would ſeem to be originally a diſorder at the origine of the nerves, from their readineſs to affect the inſtruments of voluntary motions with involuntary and ſometimes very forcible, painful and obſtinate contractions: but there are other good reaſons, as in the caſes of irritation, &c. to conclude that ſpaſms may be produced by an affection of the parts they convulſe; for however the fluids may be affected ſo as to render the ſecretions of the nerves from it weak, irregular or unequal; it is more than probable alſo, that the ſame ſtate of the fluids as they waſh theſe parts, where the ultimate filaments of theſe myſterious organs are expanded for the purpoſes of ſenſibility, may prove an immediate cauſe of irritating them into theſe ſpaſms.

I SHALL only obſerve further of Cramps, that they are a ſpecies of pain in ſenſible parts, not cauſed or excited by any previous obſtruction or inflammation in them; hence it is that they rarely excite any remarkably feveriſh ſymptoms while they continue, but often on the contrary they ſink the pulſe and induce a languor upon the powers of the circulation. We have reaſon likewiſe to apprehend that there is a previous languor of the functions of theſe parts upon which they ſeize, which gives occaſion for their invaſion. So far as can be gathered from all appearances, there is a languor and unordinary indolence in the action of all the chylopoetic viſcera at theſe ſeaſons when ſuch abdominal diſorders are moſt frequent; and not only upon them, but upon all the internal parts which lie remoteſt from and are leaſt connected with the ſurfaces of perſpiration: which ſeems to be the reaſon why the humours, when they come to be leſs exhaled by the decaying autumnal heat, fall back upon theſe parts, load their action and excite theſe painful ſpaſms, without forming any obſtinate fixed obſtructions, which vernal diſeaſes are ſo apt to produce, on account of the greater firmneſs and tenacity of the blood and elaſticity of the ſolids at that time of the year.

NOW as to the matter of ſudden deaths, I ſhall not take it upon me to determine that they are certainly or always more frequent in and about the harveſt quarter than at any other ſeaſon of the year: I ſhall only preſume to recommend it to further obſervation whether both theſe and paralytic diſorders, particularly that ſpecies of them called hemiplegias are ſo or not.

Such deaths are either inſtantaneous without any previous warning or ſickneſs, or they are preceded by ſome ſigns which denounce and threaten them. If the firſt kind are ever cauſed by a diſeaſe of the head, they more properly deſerve the name of a palſy than that of an apoplexy: but from various examinations and obſervations there is much more ground for aſcribing them, either to a palſy, or to a rupture of the heart (ſo that heart-burſting is by no means ſuch an improper phraſe as the vulgar uſe of it would make one ſuſpect) or to the ſudden detachment of polypus's or grumous blood from their adheſion to the large veſſels about the heart. Where death is occaſioned by the gradual increaſe of ſuch adheſions without their being detached; that is always clearly indicated before hand, ſo as to enable a ſkilful perſon to prognoſticate certain death, and the danger of a ſudden one.

AMONG ſuch ſudden deaths as give warning of their approach an apoplexy is attended with ſymptoms which diſtinguiſh it from any other cauſes: the certain ſigns of it are profound ſleep, a high ſtrong reſpiration, a large, full but ſlow pulſe, a high colour in the face and parts near the head, profuſe ſweat often, and great warmth all over the body.

THAT cauſe of ſudden deaths which is under conſideration at preſent, may be conſidered as quite the reverſe of an apoplexy. It is introduced by an uneaſy (and ſometimes at the very firſt an acute) pain as if in the upper part of the ſtomach between the breaſt and belly, or in the anticardum, that cavity at the end of the breaſt bone commonly called the pit of the ſtomach. If the pain comes on gradually, it gives the more opportunity for prevention. The pain is of that nature as to affect the ſpirits immediately and cauſe the uneaſy ſenſation which one has when threatened with a fainting fit; ſuch a pain it is, ſo far as I can gueſs, as one feels upon receiving a ſudden blow or injury upon the pit of the ſtomach: as this pain continues it is felt to affect the body a-croſs from back to breaſt, and from ſide to ſide, with a pain, tightneſs and anxiety all about the precordia. The patient draws or endeavours to draw long breaths like ſighs, ſuch as attend faintings; but theſe ſighs are ſometimes cut with a ſharp pain felt upon theſe efforts; the heart either flutters or does its office faintly, the pulſe weakens of courſe, the extremities grow cold and damp, a cold ſweat riſes on the face alſo which looks ghaſtly, a difficulty of breathing comes on and the ſtiffling grows ſo great that the patient deſires an erect poſture, and ſoon after the circulation is totally ſuppreſſed. The patient all the while continues ſenſible.

EVERY anatomiſt knows that there is a ſtrict union and communication between the upper orifice particularly of the ſtomach, the diaphragm and the heart, both by adheſion of parts, and ſympathy of nerves. The moſt ſenſible expanſion of nerves in the whole body is that plexus which is diſtributed to the upper orifice of the ſtomach juſt below where the gullet pierces the diaphragm and unites its fibres with its: the heart again reſts upon the diaphragm to which it has a pretty large triangular adheſion in that ſpot, and the diaphragm is furniſhed with ſeveral branches of nerves from the ſame pair which principally form both the plexus cardiacus and plexus ſtomachicus; hence it is that theſe viſcera are drawn into ſuch an intimate correſpondence with each other.

NOTHING can confirm this ſympathy among theſe vital parts or illuſtrate the courſe of this diſeaſe more clearly, than the effects of a blow upon the ſtomach; which if violent, by means of that ſingular and intolerable thrilling pain excited, ſtuns all the nerves alſo that belong to the heart diaphragm and lungs; ſo that the perſon falls down at once motionleſs and without pulſe as in a faint, and many an one ſuch a ſtroke has deprived of life irrecoverably at once. It is evident the heart communicates its affections as immediately to the ſtomach, we ſee how common it is in faintings from bleeding, or, &c. for the perſon to grow intolerably ſick at the ſtomach and to throw up.

HOW dangerous any ſpaſm in the diaphragm, heart or lungs, whether ariſing there, or communicated by neighbouring and ſympathizing viſcera, muſt be is ſelf-evident from the im-

immediate dependence that life has upon the regular and intire action of theſe organs: it is alſo evident that any ſuch affection will immediately manifeſt itſelf by a languor and ſtagnation of the circulation, according to the degree or permanency of it; and really all theſe autumnal complaints, which are not febrile or inflammatory, are attended with a remarkable languor of the circulation, and even often an irregularity of the pulſe, which never riſes or grows regular and firm until the pain abates and the cauſe of it is ſubdued.

It is eaſy to ſee when this diſeaſe has gained ſo much ground as to affect the circulation remarkably, or got to ſuch a height as to produce a ſtagnation of it in the extreme parts and an anxiety of breathing, that there is neither time nor room for recovering the action of the heart, and reviving the circulation by almoſt any application.

The only thing which can be attempted is pouring in ſuch cordials as operate moſt inſtantaneouſly, and by a briſk friction or chaffing of the extremities eſpecially, with warm flannels, to try recalling warmth and circulation thither again.

ALL I have to ſay further upon this diſeaſe ſhall be included in the two following remarks. 1ſt, That bleeding or any other evacuation, unleſs an inſtantaneous vomiting could be excited, to rouſe the nerves and urge on the circulation, are uſeleſs and hurtful: they can be of no uſe in a diſeaſe where there is neither repletion of the veſſels nor particular obſtruction formed, and beſides that, though they were not hurtful in themſelves, if they are not principally and immediately indicated, the time is waſted in ſetting about them, every moment of which is of the laſt importance to the recalling of life in ſuch ſudden attacks.

This remark implies no reflection upon paſt practice, but is only ſuggeſted as a future caution; for under any other urgent ſymptoms, where life is ſo immediately threatened, it muſt be allowed that ſudden evacuations as well as rouſers of the nerves are indicated; and until a diſeaſe, ſuch as I apprehend this to be, is properly diſtinguiſhed from other ſuch ſudden attacks, common practice cannot be juſtly blamed for following the common rules of giving aſſiſtance.

The other remark I have to make concerns the public in general as much as the practice of phyſic in particular; it is, that though this diſeaſe is a critical one and irremediable in the laſt ſtages of it, yet in a great meaſure, I apprehend, it becomes ſo only by neglect and delay; which people who are naturally negligent of ſlight complaints, and not readily alarmed with every uneaſineſs they feel may be betrayed into, by thinking the firſt ſymptoms of ſuch a diſeaſe unworthy of notice, and what may go off as ſuddenly and inſenſibly as it came on. But where ſuch a pain about the pit of the ſtomach and a-croſs the body from the ends of the ribs to the back, or attended with any fluttering ſenſation about the heart, eſpecially in the autumnal ſeaſon and towards the latter end of the year, when complaints in the bowels of any kind are frequent; if, I ſay, where ſuch ſymptoms are felt the perſon would apply to a generous cordial immediately and repeat it occaſionally until the ſymptoms go off or ceaſe to come and go, I am of opinion that this diſeaſe, ſudden as it is, might be thus ſeaſonably repelled. In order to find ſuch a cordial in ſuch an imminent emergency, there is no occaſion to run to an apothecary or phyſician; they can adminiſter none ſo effectual as a ſufficient doſe of any generous Wine drunk as warm as it can be taken, that its effects may be the more immediate. I had the mortifying occaſion once and again to adminiſter this cordial to perſons in ſuch circumſtances as above deſcribed, when it gave immediate though but momentary relief: in one of the caſes tho' the gentleman was in his laſt moments with ſymptoms ſimilar to theſe I have mentioned, his extremities cold, his pulſe gone and labouring under ſuch a ſtrong orthopneuea, or ſuch a difficulty of breathing, that it was with reluctance he checked his panting for breath till he ſwallowed three ſmall ſips of warm Madeira, yet it no ſooner reached his ſtomach, than he cried, I am eaſier, I am eaſier, and whereas he could only ſit erect before on account of that intolerable anxiety, he ſought immediately to lie down, and though he expired ſoon after, it was without any further ſigns of pain or ſtruggles for breath.

I HAVE the greateſt reaſon to believe that ſuch a cordial timeouſly and largely taken and repeated as found neceſſary will diſpel the firſt approaches of this rapid diſeaſe; indeed for ſome time after it would be proper that perſons ſo relieved ſhould take care of themſelves, and uſe ſome ſuch medicines as warm and gently move the inteſtines, uſing light diet, and wine more freely than at other times. Theſe alſo I take to be neceſſary rules of precaution for ſuch perſons as feel frequent twitchings and pains about the pit of their ſtomach or the neighbouring parts, particularly in theſe autumnal ſeaſons when complaints in the bowels of any kind are epidemic.

Thoughts on the natural Cauſes of the Bile's Putreſcency and its Noxiouſneſs in the Circulation.

BILE in the firſt paſſages is abſolutely neceſſary to digeſtion, and to the concocting of our food into a liquor fit for being converted into blood: but while it ſo changes our aliments in the duodenum, it is alſo by them changed itſelf; for bile in form or unchanged entering into the blood in any quantity is a certain however ſlow poiſon, which diſſolves its natural texture, and enfeebles the action of the ſolids upon it bearing it forward in its progreſſive motion. In this Bile reſembles various poiſons which are inoffenſive in one part of the body, and are certain death in another part of it. In order to underſtand the nature of bile more perfectly and the cauſe of its malignity in the circulation, we are to conſider that it is wholly elaborated from venous blood. It is only the venous blood that can be conſidered as perfectly animalized: there is in this reſpect a great difference between the blood of the arteries and that of the veins.

THAT the arterial blood is not perfectly animalized is evident from the elaboration of milk from it, which contains a very large proportion of acid in it and that very eaſily procured: for which reaſon we muſt conſider the veins as deſtined for ſomething more, for ſome further purpoſe in the œconomy, than merely for carrying the arterial blood back to the heart, after it has reached the extreme arterial veſſels. In the veins the blood is always compleatly animalized, ſo that then it will yield no further vegetable or aſceſſent characters. What in all probability contributes in a great meaſure to this compleat change is the weaker degree of force with which the veins act upon the blood, not ſqueezing it forward with that vigour which the arteries do; by which means the blood has more leiſure for a greater degree of inteſtine motion in the veins than it has in the arteries. It has likewiſe by the ſtructure of the veins, whoſe coats are both thinner and more expanſile than theſe of the arteries, much more liberty to expand itſelf laterally which greatly favours its exerting a greater degree of inteſtine motion than the arterial blood does. Add to all this the reverſed courſe of the blood in the veins: the blood in the great arteries is hurried on by the contractions of the heart and vibrations of the arteries; the further it goes it has the ſmaller opportunities of conceiving too much inteſtine motion, by the conſtant diviſion of the veſſels into ſmaller, and ſmaller ones until they become of undefineable tenuity. In the veins on the contrary, by theſe innumerable ramifications conſtantly uniting into larger and larger canals, the fluid, at the ſame time that it is leſs agitated by the veins, and forced into progreſſive motion which checks its diſpoſition to ſelf-conceived inteſtine motion, it muſt be conſtantly mixing more intimately and partaking of a much greater degree of inward motion among its parts. Upon this inteſtine motion of fluids it is, that all change in them depends, and therefore, we have good reaſon to conclude that the blood is never thoroughly animalized until it has gone the courſe of the veins.

At the ſame time it is highly requiſite to obſerve, that the blood is no ſooner perfectly animal than it becomes unfit to carry on the animal proceſſes any longer, without a freſh mixture of chyle: I don't ſuppoſe that venous blood, without a freſh ſupply, would not go the courſe of the arteries again; but that ſuch blood would viciate and totally alter the ſecretions, theſe innumerable and various glandular ſecretions made from the arterial blood.

THIS points out the moſt remarkable difference there is between the bilous ſecretion, and that of any other in the whole body: it is in a manner wholly derived from venous blood, which neceſſarily implies, that it muſt of courſe be the moſt exaltedly animalized fluid in the whole body. But there are ſeveral notable circumſtances adjuſted to render it ſtill more highly animalized, than its being ſimply a venous ſecretion does. The viſcus which ſecretes the bile is by far the largeſt in the whole body; by which means the venous blood is again ſeparated into an inconceivable multitude of ramifications, which have no pulſatory or arterial action upon it, though the veſſels ariſing from the capſula of the vena portae aſſume an arterial ſtrength.

By the by, I cannot help taking occaſion to obſerve here, that we have it manifeſted to demonſtration, by the modification of the circulation in the liver, that the pulſations of the heart and the vibrations of the arteries are not aſſential to the circulation of arterial blood; and conſequently, that theſe actions, likewiſe have ſome other more capital end and purpoſe which they anſwer, beſides that.

But again, the blood conveyed into the liver for furniſhing the bilous ſecretions is not only collected from all the other veins of the chylopoetic viſcera, but it is alſo impregnated with all the animal and highly exalted ſteams, which are more profuſe and copious in the abdomen than in any other part of the body; for it is not only impregnated with the acrimonious effluvia which ariſe from the refuſe of the chyle when it reaches the great guts, but ſuch effluvia alſo as ariſe plentifully from the external ſurface of the inteſtines, are intercepted and taken up by the omentum: which web is expanded over them for that very purpoſe, as well as to anoint the foldings and plies of the inteſtines, and lubricate them properly for that conſtant ſliding and friction upon each other occaſioned by their periſtaltic motion, and theſe ſteams ſo abſorbed by the omentum, are conveyed along with a due proportion of its attenuated oily parts into the vena portae.

HERE I take the liberty to offer a reflection which has often occurred to me, upon the rational propriety of attempting to adminiſter hepatic medicines by glyſter; by which means may they not be conveyed unto the liver in larger doſes, by a ſhorter courſe, and leſs altered than given by the mouth; in which courſe one would apprehend every ſubſtance muſt have almoſt wholly depoſitated its own form and become thoroughly animal before it arrives at the liver? But to return,

BESIDES all this re-abſorption of animal ſteams into the meſeraic, epiploic, gaſtro epiploic, &c. veins, there is another not inconſiderable viſcus, namely, the ſpleen, which no other uſe can be aſſigned to, than that of concocting venous blood for the uſe of the hepatic ſecretion; and the ſtructure of this viſcus is very remarkable, in which it is provided that the blood ſhould be for ſome time ſtagnant, in a manner, in its cavernoſities, that it may be committed there wholly, for a ſpace, to its own internal fermentation and motion of its parts, before it is taken up again by the veins and conveyed into the vena portae.

UPON the whole, it appears evident from the peculiar courſe and impregnations of the blood which is deſtined to ſupply the bilous ſecretion, that its preparation in a great meaſure lies in retarding and ſpinning out its progreſſive motion, and in giving it particular opportunities of having its inteſtine motion increaſed; that its animal nature is thereby exalted, by the time the bile is ſecreted, to that degree that this ſecretion becomes exalted too much to be any longer a fluid fit for circulation.

I SHALL not take upon me to determine wherein it is particularly that the virulence of any humour, or of theſe infectious miaſmata which characterize putrefaction lies; but I am inclined to think, it conſiſts in ſuch an exaltation and rancidity of its oils and ſaponacious parts as tend to diſſolve the texture of the blood, and acts in it, by increaſing its inteſtine motion, as a ferment; which always generates a change, into its own nature, of theſe particles of the blood which are moſt ripened for ſuch a change, by having continued longeſt in the circulation.

THIS remark, in the mean time, we muſt carry along with us of the nature of the blood in the animal œconomy, that tho' it naturally aſſimulates the chyle from an inferior to an higher or animal ſtandard and nature, yet it has by no means the ſame power of reducing back to its own ſtandard what is exalted above that animal pitch which is natural to health; whereas on the contrary, when any of theſe malignant effluvia are generated in, or taken into the blood, they have the ſame influence in diſpoſing its moſt animalized particles or effluvia to change into that ſame malignant nature, as yeaſt has in diſpoſing wort to generate yeaſt and an inflammable ſpirit. For the tendency of all the highly animalized parts of the blood is to grow putridly virulent and volatile; but nature in general has provided for diſcharging them by one or other of the ſecretions, or fixing them to ſome of the ſolid parts, before they arrive at ſuch a cauſtic nature. This is ſufficient to give us an intelligible idea of the nature and effects of all animal poiſons and infections: as for vegetable and mineral ones, their virulence lies either in their corroſive and inflammatory effects upon the nerves and ſolid parts, or in their conſiſting of ſuch vegetable combinations as the animal œconomy not having power to ſubdue, it becomes overcharged and ſubdued by them.

But to return, it is evident that the bilous ſecretions are highly animal and ſtrongly diſpoſed to acrimony; for there is good reaſon to apprehend that it is not poſſeſſed of that pungent bitterneſs which characterizes it, when freſh ſecreted by its ducts; but that it acquires it by its ſtagnation in the gall bladder; which ſhews how much that liquor is diſpoſed to inteſtine motion and acrimonious change upon its ſtagnation. This liquor then is very fit for being poured in upon the aliments as they paſs the duodenum, and to act as a menſtruum in them, diſpoſing them thereby more to the animal change and that degree of fluidity, inteſtine motion and volatility of parts which is neceſſary to their paſſing freely by the lacteals. But bile is a liquor very noxious to be abſorbed by itſelf into the circulation, as it inclines the animalized parts to too great inteſtine motion and diſpoſition to putrid change: the more the inteſtine motion of the parts of the blood is heightened, the more diſſolved will it become and the weaker will the progreſſive motion grow. All this is confirmed by the well known ſymptoms of icteric diſeaſes, where the action, vigour and tone of the ſolids, and the progreſſive motion of the fluids, with the ordinary ſecretions depending thereon, are enervated and ſuppreſſed by the inteſtine motion which ſuch a malignant fluid generates in the blood.

It is ſelf-evident, that the heats of ſummer, eſpecially if long continued or attended with much moiſt, relaxing weather, in which the barometer ſtands low, muſt, by relaxing the ſolids, expanding the fluids and enervating all the vital as well as voluntary actions of our frame, contribute to the exalting or vitiation of the bilous ſecretions; any part of which reabſorbed muſt contaminate the blood more than it does at other times, when the fluids are neither ſo weak nor the bile itſelf ſo acrimonious. At the ſame time the bile being conveyed into the inteſtines in its natural courſe and for its natural purpoſes, its greater than ordinary degree of tendency to putrefaction will weaken and injure the action of the fibres of the inteſtines, rendering them more torpid and feeble and conſequently diſpoſing them more to cramps, ſpaſms and convulſive efforts to recover their natural tone and actions.

Now I would define a ſpaſm to be a violent, irregular, unvoluntary effort in the nerves to excite theſe regular motions and actions depending on them, which are much weakened and have loſt their natural vigour, by whatever cauſe. What greatly contributes to excite and irritate theſe ſpaſms in the bowels, is the ſtruggle that is raiſed by two oppoſite fermentations. Weakened inteſtines, by whatever cauſe, diſpoſe all vegetable aliments to an acid fermentation in the ſtomach; while the great end of the bile is to diſpoſe them to an animal one: theſe colluctations generate elaſtic effluvia, which diſtend the inteſtines and irritate their ſenſible fibres. This is remarkable in the caſe of gripes in infants, whoſe ſtools ſhow the evident marks both of acidity, in the curdled ſtate of their excrements, and of bile in the green colour of them.

But both the caſe of infants, and the ſymptoms attending all autumnal diſorders of the bowels in effect prove, that theſe pains, as they are in part excited by bile and have it for their immediate as well as their remote cauſe, ſo ſuch pains reciprocally tend to irritate and ſolicit an increaſed ſecretion of that liquor from its pore and duct.

Phyſiological Thoughts on Spaſms and the Seat and Origin of them in the Animal Oeconomy.

AS a great many affections of the animal œconomy are referred to cramps or ſpaſms, it would be of uſe to have a determinate idea for that affection; which perhaps is not eaſily to be attained, conſidering that, Pain, by which it diſcovers itſelf, is a ſenſation that may be excited by other cauſes as well as by ſpaſms, and it is difficult to trace the nature of a cauſe from its effects, while theſe are ambiguous. We ſhould have no idea of ſpaſms at all, if it were not for their ſenſible effects upon the organs and inſtruments of voluntary motion; which ſuggeſts one leading inference as to the nature and ſeat of that affection; namely, that it is an action excited in the organs of voluntary motion and alſo of the vital ones, without the conſent or direction of the will, and which neither the will nor the force of the vital actions have, at the time, the power to ſtop or controul.

THE animal machine is the moſt wonderful fabric, both for contrivance and execution, in the whole compaſs of nature. The materials of which it is compoſed are out of the common ſtock which nature furniſhes, but the adjuſtment and combination of theſe materials are truly marvellous: a ſyſtem of veſſels and of fluids circulating in them, built upon and encaſed in an elegant, firm and well adjuſted compoſition of ſolids generated out of theſe veſſels themſelves, and connected together by them in ſuch a wonderful manner, that they reciprocally act as the ſupporters of each other: the bones being the paſſive ſuſtainers of the whole frame; while the fluids and flexible ſolids or veſſels nouriſh the bones and give them that union with one another which renders all theſe bones, which have no union among themſelves, one whole, moving, yet firm baſis of connexion among all the parts.

THE moſt general diviſion of animal parts, conſidering them as animalized, is that of ſolids and fluids. The ſolids may be diſtinguiſhed into bones, which, though perforated with numerous veſſels which convey fluids among their parts, yet may be conſidered as cohering maſſes of matter neither moving (i. e. having no internal motion of their parts) nor flexible, after they are fully grown; and into veſſels for containing and acting upon the moving fluids in them. The parts of theſe veſſels cohere as the bones do, but are flexible. The vaſcular ſyſtem is compoſed of ultimate fibres, contiguous to one another, partly adhering and partly ſo cloſely interwoven with each other that they cannot get ſeparated, but are kept in contiguity tight enough to act as containing veſſels to the fluids, though not ſo cloſe as to prevent ſome of the effluvia of the fluids from eſcaping their pores and wandering out of the circulation, till they come in the way of abſorbing veins to take them up again.* This is not an unintentional accident in our frame, ſeeing it anſwers the moſt neceſſary purpoſe of keeping the outſides of the veſſels properly bedewed with moiſture and ſuppled for their functions. One thing is very wonderful in the compoſition of the animal ſyſtem in relation to the bearing of parts with each other; the bones and veſſels, fluids and ſolids, nerves and muſcular fibres, muſcular fibres and tendonous ones, tendons and membranes are as clearly diſtinguiſhed from each as colours are in the rainbow; yet it is almoſt as impoſſible for the moſt penetrating obſervation to aſcertain the points where theſe paſs into each other in the animal œconomy, as it is to fix where the colours change from one into another in the rainbow. The ways of nature are inſcrutable in its changes and elude all human proſecution.

---

* The office of the Lymphatics, in particular, as abſorbents, is a recent diſcovery diſputed between two eminent anatomiſts; both whoſe abilities as ſuch are ſo well known, that it can be doing injuſtice to neither of their merits, to ſuppoſe that they are, both of them, original diſcoverers of that doctrine or fact.

ANATOMICAL obſervation renders it very preſumable that, tho' the nerves in their coats have all the appearance of branching off, dividing, and decreaſing as they do ſo, from their trunks, in the manner of blood veſſels; yet that the nervous filaments, which paſs off in bundles along theſe dividing coats, are not in fact divided and multiplied by decreaſing ramifications of their ſubſtance; it being ſuppoſed that every filament is divided from all others at its origin from the brain. Yet this is very hard to reconcile with our ideas of their termination in ſenſible points; for, whatever their tenuity may be, it is impoſſible to conceive there is the termination of a nervous filament for every ſenſible point within and without the body; ſo that upon the parts where they are expanded for ſenſe, they muſt be either involved and waved in every point and direction, and receive impreſſions laterally, as the fluid in an artery does when its ſides are preſſed together; or elſe a nervous filament coming from the brain muſt, when it forſakes its coats, communicate by inoſculation with fibres as fine as itſelf, which fibres by communication with it and with one another, convey from their extremities ſenſible impreſſions back through it to the ſeat of perception. This, I am much inclined to apprehend, is fact, and it is more than probable that the other ſuppoſition is fact alſo: nay we have proof that it is ſo, in the ſpiral diſpoſition of the nerves under the ſkin of the organs particularly prepared for feeling.

I CANNOT conceive that there is any difference, as to general ſtructure and properties, between any ultimate fibres and nervous filaments, ſave that the former are not propagated in direct lines from the brain, as the others, but only communicate with them by various junctions and anaſtomoſes; ſo as to render the nerves the medium of *will*, *ſenſation* and *vital action* to them: for it would appear to me, that all theſe three diſtinctly, belong to the office of nervous filaments. Perhaps too, for ſome very important purpoſe, the ultimate fibres may have the ſame correſpondence with, and relation to, the final attenuations, of the coats of the nerves, as I have ſuppoſed they have with the nervous filaments themſelves: for though I do not think that the meninges of the brain are the theaters of either perception or will; yet I do not think that their ſole function is that of being a paſſive covering of the brain, and yielding ſheaths to the nerves when they go out of it.

ONE thing which perſuades me that ultimate fibres muſt communicate by their ends falling indifferently upon each others ſides is, that even circulatory veſſels for fluids are generable. I may perhaps in this opinion differ from ſome very great phyſiologiſts: but I cannot give my aſſent to the doctrine of infinite diviſibility even ſo far as to perſuade myſelf, that there are as many veſſels in an embrio as there are in a new born infant. For if we have any certain proof that one new veſſel can be accidentally generated in the body; as we moſt certainly have in the caſes of various wounds and inflammatory adheſions of parts, where an intercommunication of both fluids and ſolids, not previouſly exiſting, is formed and eſtabliſhed; then we have not the leaſt reaſon to ſuppoſe there is one veſſel in any animal rudiment, prior to the action of conception upon it. For, whatever motion may be obſerved in animalculæ, as they are called, it is no more a proof of their being real ſelf-moving animals, than the motions of motes in the ſun beams are a proof of their being animals: though I have no doubt but that theſe animalculæ are regular combinations, with ſuch a compoſition of rudimental parts as to diſpoſe them to ſhoot out all the various parts and veſſels of animals, upon their being committed to the recepticles nature has provided for them, and there fed with that warmth and theſe fluids which are adapted to their nature.

It does not ſeem to be a matter of much conſequence, whether either the nerves or ultimate fibres are perforated or not, if it can be aſcertained that there is an active fluid which flows and acts in them according to their lengths; and this, I think, will not be called in queſtion by any who believes that even elaſticity, and ſuch other properties of matter are not owing to immaterial principles of action implanted in it, but to the action of a penetrating fluid, whoſe power is modified by the particular organization of the different ſubſtances which it ſo animates. It appears however impoſſible to me that either the nerves or the ultimate fibres exert their powers merely by their elaſticity; though, notwithſtanding their various involutions and conſtant fomentation in animal fluids, it is evident by the retraction of the ſolids in all caſes of wounds, &c. that they are naturally in an elaſtic ſtate. But elaſticity nevertheleſs will by no means account for the functions performed by animal ſolids.

Irritability to be ſure is a term more ſuitable for ſuch effects; though it is a term which conveys no idea of the cauſe of the phenomenon, and I am not fond of ſuch terms as imply an occult, inexplicable cauſe of properties, which are both generable and deſtructable in matter, by the various changes in nature which it undergoes. It is enough, fully enough in all reaſon, if ſuch terms are admitted, and in want of better muſt be uſed for theſe motive tendencies which appear in matter under all the forms it can be metamorphozed into.

BUT, if we conſider the ſimilitude between that activity ſubſiſting in animal fibres and electricity, and conſider, at the ſame time, that moſt animal ſubſtances are electrics *per ſe;* one can ſcarce miſs concluding that the animal fibres and oils are electrics *per ſe*, in a ſtate of electricity; that is having that power not only excitable in them, *but they ac-*

tually in the exertion of it, as really as a chryſtal globe is during friction; tho' modified in a way and manner peculiar to living animals, nay, in many inſtances, remaining in their ſubſtance after death or a ſeparation of parts:* that is, while the true animal heat and action in the ſolids and fluids is not evaporated, nor ſuperſeded by a putrid heat and fermentation of parts; which is a reſolution of all the animal proceſſes and properties. Putrifying or putrid bodies, for ought I know, may be the ſubjects of ſome kind of electricity too; but if they are, which is however ſcarcely probable, for an obvious reaſon, it muſt be of a different kind from that modification of it which is proper to animals: for that it is a general power variouſly modified in different ſubſtances there is no reaſon to doubt. But electricity is a ſubject I may have ſome other occaſion of diſcuſſing more particularly by itſelf.

---

* For full proof of this ſee Dr. Whytt's learned and ingenious *Eſſay on vital and other involuntary motions of animals*, where he has fully proved, by a ſeries of curious experiments and obſervations, that the power of motion depends upon a principle, not abſolutely confined to one organ as a ſource and fountain of all motion in the members, but which is, in ſome meaſure, reſident in every part: which principle is ſo intricate, refined and abſtracted from all our perceptions, that I ſhould without heſitation admit it to be immaterial; if I were ſatisfied any power could be ſo, which does not exerciſe conſciouſneſs of its own being and circumſtances, and of the exiſtence, and the modes of the exiſtence of other things; with the power of reflection, or of recognoſcing theſe at will, by means of language; upon which capacities, the exertion of our reaſoning powers ſeem immediately to depend.

But before we conſider or can thoroughly underſtand the nature of that mutual action and re-action of the animal fluids and ſolids upon each other, it is neceſſary to bring another agent upon the ſtage, and that is *animal heat*, which is a different body from either ſolids or fluids, though they are the ſeat of its influence. In point of matter and ſubſtance, I take it for granted that heat, fire, light, æther, or whatever name can be given to an all-penetrating fluid are the ſame. It lies not within the compaſs of my deſign here, to attempt eſtabliſhing this point by argument, or even to repeat now what the great Boerhaave and later authors have eſtabliſhed as to the nature and univerſality of the ſubſtance of fire. Sir Iſaac Newton has been the moſt unlucky of any philoſopher in his conjecture thrown out by way of quære upon that ſubject. It is ſurprizing that a philoſopher who had profeſſedly made light ſo much his ſtudy, and who knew that a lens or ſpeculum could give it ſuch a direction as to exert in itſelf the moſt ardent effects of heat and fire, ſhould make a queſtion; whether red hot iron was fire or not? when he knew that no body could be heated without being penetrated, and alſo that no body can penetrate itſelf; nor can it be penetrated by any ſubſtance whoſe parts are not only ſmaller than its own parts, but ſmaller than the interſtices between its parts, which interſtices muſt always be conſiderably ſmaller than the parts of the body which define them. It is the more odd ſeeing he did not hold inteſtine motion of parts to be characteriſtic of fluidity; which is the only example of ſeeming ſelf-penetration we have in terreſtrial bodies, though it can be conſidered as ſuch only in a very groſs and unphiloſophical ſenſe.

HEAT is not only an accidental character of the animal œconomy which it poſſeſſes in common with other bodies when it is excited in them; but, ſince the days of Hipocrates and, I dare ſay, as long before them as it is ſince, it has been accounted an eſſential property of animal life; though in different degrees according to the various natures of different animals. It is a ſpecies of fire that has never been extinguiſhed ſince living creatures were formed. It is of importance to notice of this heat, that though it muſt communicate with the ſubſtance of heat, or fire, or light as far as that extends every where in contiguity of parts, yet in every individual animal it is ſubjected to act according to that modification, ſtructure or organization of parts its influence is regulated and directed by in them.

THEREFORE though fermentation, putrefaction, effervеſcence, the animal proceſs, &c. &c. generate heat, yet that heat is nevertheleſs a particular kind of action in each, exactly ſuited in nature to the corpuſcles it is generated or maintained in; juſt in the ſame manner as, though every body reflects light, yet it reflects only that kind of light which belongs to the nature of the body in reſpect of colour. There is one very remarkable and important proof of this, upon the attendance to which a great deal depends. Nothing can prove more fully that animal heat is diſtinct in its own nature, and eſſentially different as to the form of its emanation, from putrid heat, than this conſideration, that it is not mere heat that generates putrefaction in animal ſubſtances: for there is greater heat in an animal body otherwiſe ſound, where there is no tendency to putrefaction, than where there is any inclination or tendency to that change in the ſame body; in like manner there is greater heat in an inflammatory fever, than there is in a putrid one. I need ſcarcely mention likewiſe, that the moſt accurate practitioners and attenders to nature in medicine agree in diſtinguiſhing the ſenſation of a putrid heat from an inflammatory one. But for convincing proof of what I ſay, that heat ſimply conſidered as ſuch is not the cauſe of putrefaction; and that animal ſubſtances will bear a much ſtronger heat without change of their animal nature, than that degree of heat which changes them, I need only refer to the daily pteparation of animal food by the fire. From the whole I ſhall not ſcruple to propoſe this corolary, that one method of reſiſting putrefaction is, *to raiſe the animal heat above that degree which allows the animal fluids to tend to it.*

THIS conducts me alſo to another inference of ſome conſequence; which is, that though all heat implies a degree of inteſtine motion of the matter of heat, as likewiſe a tendency to it in theſe ſubſtances in which it acts by impreſſing its activity upon them, yet *the animal heat is preſerved from degenerating into the putrid, by its activity prevailing in the progreſſive direction of the animal œconomy.* It is ſelf-evident that the action both of the fluids and ſolids of animals is progreſſive, or according to the lengths of the veſſels. The nerves miniſter both ſenſation and will, backward and forward in that direction; the muſcular fibres are inflated longitudinally in muſcular motion, which contracts their lengths, and the maintenance of life depends upon the progreſſive motion of the fluids.

One may ſay, how can the ſubſtance of heat, be ſubjected to a particular direction, which can be confined on no ſide, and is conſtantly acting in every direction; I only aſk again, how can the ſubſtance of electrical fire receive direction; which is as ſubtile as that of animal heat, and as diffuſive at every pore of an electrified rod as it is from end to end; as every one may know by touching any part of its ſide with an unelectrified body? In the animal œconomy the lateral heat applied to the nervous filaments and ultimate fibres every where by the fluids and neighbouring parts muſt direct the ſame ſubſtance in them to act principally or flow in a longitudinal courſe. I have elſewhere endeavoured to prove that it is the ſubſtance of that fluid, which we perceive the exiſtence of by its influence, as light, heat, fire, &c. that is ſecreted by the brain and diffuſed along the nervous ſyſtem, and all the ultimate fibres of the body.

THIS fluid has a two-fold motion in the body, one in all directions indifferently which exerts itſelf by expanding and mixing the fluids in a juſt proportion: another progreſſive or longitudinally along the animal veſſels. Theſe two regulate one another and bear an exact proportion to each other. If the ultimate fibres were not full of this fluid fit for action, as an electrified body is, which may be obſerved in the down of a feather within the action of electrical aura, muſcular motion could not be performed; for a ſecretion ſufficient to inflate a muſcle and ſwell it could not be made inſtantaneouſly by a few nervous filaments communicating with ſo large a body, which ſhould in that caſe be conſidered as a viſcus for the reception of the fluid the nerves diſcharge into it: but all the muſcular fibres are kept always full by the animal heat, and it always is exiſting in them in a condition which determines it into longitudinal action, upon every impulſe of either the vital or voluntary principles of motion in the body.

It is this ſtate of the ſolids which regulates the circulation, and determines both the attenuations of the blood, and the changes of it into new characters, according to the varied action of the glandular fibres upon it. It is the weakneſs of this fibrous fluid's longitudinal action, I apprehend, that relaxes the ſolids, and is the occaſion of what is called an *Error Loci* of the fluids, with all other kinds of obſtruction. For this reaſon, it would ſeem, obſtruction and inflammation is always, in ſome degree, the conſequence of pain ariſing from any external injury;

for

for pain being produced by any ſudden concuſſion or obſtruction of that fluid in the ſenſible nerves, their natural ſecretion and the future motion of the nervous fluid along the veſſels communicating with the injured nerves is weakened; they loſe their reaction and balance as veſſels upon the progreſſive motion of the fluids, which conſequently hurry into them as forming canals in too great quantity, and without that due reſolution which the natural action of theſe ſolids would otherwiſe produce upon them; they accumulate, the ſenſible nerves become more and more preſſed, and their fluid, inſtead of getting freely forward as before, reacts upon the ſeat of perception, and ſo the ſenſe of pain continues or increaſes according to the nature, greatneſs or obſtinacy of the obſtruction.

We are not to conſider a tranſlation of red globules into ſerous veſſels by an *Error Loci*, as the effect of their being ſqueezed in by force; but as the effect of the ſolid fibres which form theſe veſſels becoming relaxed, and ſo freely admitting theſe globules which in a natural ſtate of the veſſels would have diſſolved of themſelves upon their approaching their orifices. For, I cannot imagine, that ſolution is performed by any grinding force upon the fluids, but much rather, I humbly conceive, by a diſpoſition in them to ſeparate or change whenever they enter ſuch organs, by a modification of the animal heat and its action in the pervious lengths of the ultimate fibres which compoſe the organs, whether glandular ones or others.

I CANNOT take upon me even to gueſs, whether the nerves which officiate in voluntary motion, conveying the intimations of the will to the members, and theſe nerves which convey the ſenſations of the members to the perception, are individually the ſame filaments, only affected longitudinally from their oppoſite extremities; or are diſtinct filaments allotted for theſe two different offices. But however that is, it is more certain that all ſpaſms are at leaſt contractions of the nerves or of the ultimate muſcular or ſenſible fibres correſponding with them, by a forcible, irregular infuſion into them of that active fluid which animates them, without the conſent of the will. Now I can form no other conception of the contraction of a nerve or of any ultimate fibre, but that it is executed by the forcible infuſion into it, or action in it, of a ſubtile fluid, filling it ſo as to ſhorten its length, and render its breadth more turged and thick. Whether theſe ſpaſmodic impreſſions take their riſe at the origin of the nerves and in the ſeat of perception and will; or whether ſpaſms, taking their riſe in any weak part, are communicated from nerve to nerve by correſponding branches and inoſculations, without

out reacting back to and diſturbing the ſeat of voluntary and vital influence: or whether they convey their diſeaſe by reacting back to their origin, and thereby diſturbing the offices of the nerves, at their common fountain is hard to determine.

THAT pain is a common ſource of ſpaſms is certain, from the convulſions excited by means of acidity, obſtructions, worms in the *primæ viæ* and teething in children; alſo from many caſes of convulſions brought on by wounds and violent inflammations, &c. It is alſo moſt certain, that no particular region in the body is ſo apt to draw the other nerves into general ſympathy with it, as the ſtomach and inteſtines, under their acute affections, are. It is preſumable, at leaſt in ſome caſes, that this diſorder of ſpaſms, and theſe ſome of the moſt violent effects of them, take their riſe at the origin of the nerves; as in many caſes of the Epilepſy, where it is not uncommon for ſuch ſubjects to receive warning of its approaching paroxiſms, by a feeling or ſenſe of cold, numbneſs or ſome other ſuch perception, beginning in ſome particular ſpot or extremity of the body, which aſcends gradually to the head, when they immediately are thrown into the convulſions of that melancholy diſeaſe. This ſeems to be nothing leſs than an affection of ſome particular nerve or nerves, which, whenever it extends to its origin, throws the whole inſtruments of the will's power into diſtraction and involuntary exertion. From which alſo we may gueſs that the production of ſpaſms is a violent effort of nature to throw off the diſeaſe and relieve the oppreſſed nerves, by calling in the efforts of the whole nervous ſyſtem to their relief. It is moſt certain that ſpaſms excite pain, of the moſt acute kind, in various parts of the body, and in the bowels particularly.

Spaſms are eaſily known to be ſuch, when they affect theſe parts of the body of whoſe motion we have the ſenſible, conſcious command; but it is not ſo eaſy in other parts to diſtinguiſh a ſpaſmodic pain, from that pain which may ariſe from other cauſes. Upon the whole, it is certain that ſpaſms and pain act, in various inſtances, as mutually the cauſe and effect of each other.

There is one thing more neceſſary to be attended to in regard to cramps, that, namely, they are certain indications of the natural vigour and action of the parts they affect, if not of the whole œconomies, being relaxed and impaired. Wherever they are frequent, epidemical or conſtitutional, they are a certain ſign, that the progreſſive motion of the fluids is declined; and of conſequence, that the progreſſive vigour of the animal heat, acting both in the fluids and ultimate fibres and nerves, is more languid than it ought to be; which occaſions the nerves, not finding their natural action duly balanced by a reaction of heat from the vigorous progreſſive motion of the fluids, to exert themſelves in ſpaſmodic contractions in particularly weak parts, on account of the inſufficiency of the ſyſtem in general to perform its functions in due ſtrength and order.

Tho' pain is a ſymptom common to both ſpaſms and inflammations, yet theſe two muſt, I apprehend, have their characteriſtic diſtinctions from each other. The one ſeems to be an obſtruction and reſiſtance of the natural courſe of the nervous or fibrous fluid, by the increaſed motion and heat of the other fluids: the other an over-ſtrained action of the fibres or of the fluid organizing them, thro' want of a due reaction of the fluids in their progreſſive motion upon them. An exceſs of the one is apt to excite general convulſions; a violent degree of the other, namely, ſpaſmodic pain, endeavours to relieve itſelf by a tranſlation of the pain to other parts: hence it is that ſpaſmodic pain is frequently ſhifting from place to place; whereas inflammatory pain ſhifts not, nor is relieved, but by reſolution, ſuppuration or mortification. I have noticed before that the one tends always to depreſs the pulſe, while the other raiſes it, and excites an inflammatory or ſymptomatic fever: for this reaſon, though an obſtinate and vehement degree of either will produce mortification, yet in the one caſe it is more confined to the ſeat of the obſtruction and pain; in the other ſuch a general languor is impreſſed upon the whole vital actions, that it is apt to land in a general ſtagnation of the circulation and death of the other members, almoſt as ſoon as in the original ſeat of the pain itſelf.

Hyſteric and hypochrondriac diſorders, though they are reducible to the ſyſtem of ſpaſmodic diſeaſes, and do agree with them in many general characters; yet in other important reſpects they muſt be conſidered as a diſeaſe, *ſui generis*, diſtinguiſhed from all others: they however furniſh this general maxim in common with other ſpaſmodic diſeaſes, particularly epidemic ones; that it is impoſſible to cure any of them by taking the indications of cure from particular erratic ſymptoms or pains, without a due regard paid to the original cauſe and ſeat of the diſeaſes; which is the ſtomach and other organs of digeſtion, whenever theſe are relieved, duly ſtrengthened and reſtored to their tone, and not till then, will the remoter complaints which attend theſe diſeaſes be ſubdued alſo.

UPON the whole, ſeeing long heats relax the body, weaken the circulation, increaſe the inteſtine motion of the fluids, increaſe the acrimony of the bile and favour its re-abſorption into the blood;

we have no reaſon to doubt but that both the vital and animal action of the natural heat muſt be thereby ſo weakened and the mode of its influence, probably, ſo altered, as to diſpoſe the ſolid fibres into ſpaſmodic contractions, on account of their inability to perform their regular and ordinary functions with due vigour; and the pains thereby excited are carefully diſtinguiſhed from every other ſpecies of pain, elſe we may attempt to relieve them by means which may ſtrengthen and increaſe the diſeaſe, inſtead of removing it.

FINIS.

Errata: P. 10, l. penult, for *viſcous* read *vinous*. P. 27, l. 1. for *it* read *them*. P. 33, l. ult, to be pointed thus —*viſcera muſt be,* P. 45, l. 10, eſſential. P. 72, l. 2, preparation.